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OF DEMOCRACY

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# THE EDUCATIONAL NEEDS OF DEMOCRACY

*By*

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WITH A FOREWORD BY

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## FOREWORD

By SIR FREDERICK MANDER, M.A., B.Sc.,  
F.E.I.S.

PERHAPS the most fitting tribute to Dr. Alexander's book would be to welcome it as a much needed sequel or complement to the "Hadow Report."

The spontaneous appeal of the beautifully phrased "Hadow" sermon on the infinite variety of the child mind tended for a time to leave unnoticed the anticlimax to which it led. The theory of the existence among children of many different kinds of ability, the time of their manifestation and their possible classification at the gate-way to a new post-primary sphere of education was developed, only to be followed by a tame and abortive proposal to sort out the children in practice by an examination in English and Arithmetic with the possible addition of a "written psychological test."

Dr. Alexander restates the "Hadow" philosophy of "variety in kind" in a much more orderly and scientific manner and leads

## FOREWORD

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on to a fitting climax in his practical suggestions for the classification of children in the school and classroom, for their selection for the different branches of "secondary" education and, not less important, for the treatment of backward children. His insistence on the "matching of capacity by attainment" as the overriding aim of the teacher is timely, and his theory of the factorial ingredients of the child mind is worked out so as to offer an orderly approach to its achievement. This orderly approach is shown to lie through the development of truer conception of what constitutes equality of opportunity as between child and child.

Every teacher will be the better for reading this book, whether he be encouraged, inspired, convinced or merely provoked. The chances are that, like myself, he will find that Dr. Alexander's hierarchic philosophy and its application explain his own experience in the classroom more fully than any other single theory.

And that, of course, is the ultimate test all educational theories must be called upon to pass.

## PREFACE

I HAVE had occasion to deliver a series of lectures on behalf of the National Union of Teachers and the Board of Education to various educational bodies during the past two years, and requests have repeatedly been received that they should be put into print. This book is the result. It is offered, not as a textbook on education but purely in the form in which the lectures were given. No attempt has been made at special development or arrangement.

I desire to acknowledge my deep indebtedness to the very many teachers who have, as members of my audiences, and by their questions, contributed so largely to the development of my own educational thought. It is hoped that the book may stimulate its readers to a reconsideration of the problems of education; if it accomplishes that, its purpose will be served.

W. P. A.

SHEFFIELD.

*February, 1940*



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## INTRODUCTION

THERE is a fundamental distinction which it will be well to set out clearly in the beginning : the distinction between education and instruction ; between the concept of the development of talents inborn in the individual and the conveying to an individual of a body of information or knowledge. This distinction is the more necessary because the word education is so often used when what is meant is instruction.

To begin at the beginning, the Education Act of 1870 might better have been called an Elementary Instruction Act. If you remember, it laid down a requirement on parents to cause their children to receive " efficient instruction in reading, writing and arithmetic." As a result, is it not true that schools were established primarily as places of instruction ? This definition of purpose has certain implications. There is the implication that it is equally easy to instruct different children in these fundamental subjects. This is perhaps not unnatural having regard to the



state of society, which appears to accept the same point of view in its political structure. The shibboleth that all men are equal presumably underlies the definition of instruction laid upon the schools, but it is clear that this is fundamentally untrue. All men are not equal, nor have they ever been so. They differ in every material respect: in height, in weight, in the colour of their eyes and their hair, in their abilities, their interests and their character. So, too, do children. A great body of evidence is now available which proves beyond all doubt that it is impossible to instruct children by the same methods and at the same pace, because children range in ability from one extreme to another.

This concept of instruction carries another implication. It is the suggestion that there is a standard which all children may reasonably be required to reach at a particular age; a standard laid down by society. Is it not true that many children have suffered unduly because their teachers have attempted to instruct them to the required standard when nature has decreed for them a lower standard;

## INTRODUCTION

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is it not true, also, that others have been held back once they have attained this average standard, when they could so easily have attained much more? The idea that the schools are created to perform this surgical operation of getting into children's heads certain information which society deems necessary, is no longer tenable. Education surely stands in direct contrast to such a point of view. It implies a development of the powers which are inborn in the child, at a rate and in a manner determined by the capacity of the child. It recognises the great differences that exist amongst children. There is no single standard of attainment in education which can be predetermined by society. Each child has his own standard determined by his capacity. (The task of the school is to educate each of its pupils in such a way that attainment in every case is matched to capacity.) If this is accomplished, then they are being educated in the full meaning of the word.

This fundamental distinction is, too, one of approach. If we are merely to instruct, then our approach will be that of Herbart or

Pestalozzi, an approach like that of the builder, who has his plans clearly before him and who knows at the beginning what the completed structure should look like, who is concerned merely to select his materials and to combine these in an appropriate manner in order that the plan may be fulfilled. But if we would educate, our approach will surely be more like that of Froebel or of Rousseau ; it will be more that of the gardener who hopes his plants will reach the fullness of the beauty that is inherent in them but who cannot tell at the beginning what that will be, who tends the soil, provides, as far as lies in his power, an environment in which the plant may grow, and so arranges the layout of his garden that the plants will have sunshine according to their needs.

I believe this distinction between education and instruction is fundamental. These lectures are concerned with education, not with instruction. They are concerned, therefore, with the psychological nature of children, because the first thing necessary in an educational system will be a knowledge of the psychological nature of children—their abilities, and how



## INTRODUCTION

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these vary from one to another. The approach will be to find ways and means by which we can fit the school system to the needs of the children in it and for whom it was created, rather than to find ways and means of making children fit into the school system. Our first need is an appreciation of the psychological basis of education, and this we must now discuss.

## THE PSYCHOLOGICAL BASIS OF EDUCATION

IN the last two or three decades considerable attention has been devoted to the study of the nature of mind on what is, perhaps, a more scientific basis than at any preceding time. Attempts have been made to measure human intelligence or capacity. Arising out of this scientific advance have come conflicting theories of the nature of cognition, of the power to think and to learn. Broadly, these theories fall into three categories which may be described as essentially monarchic, oligarchic and anarchic. The first suggests that there is one general factor in the mind which plays an over-riding part in human thought, a general factor which is always present in greater or less degree. It is a belief, if we may put it so, that there is a single factor of general intelligence which varies in its amount from individual to individual, the amount a person has determining his skill in the ordinary thinking processes. The second suggests that there are two or three

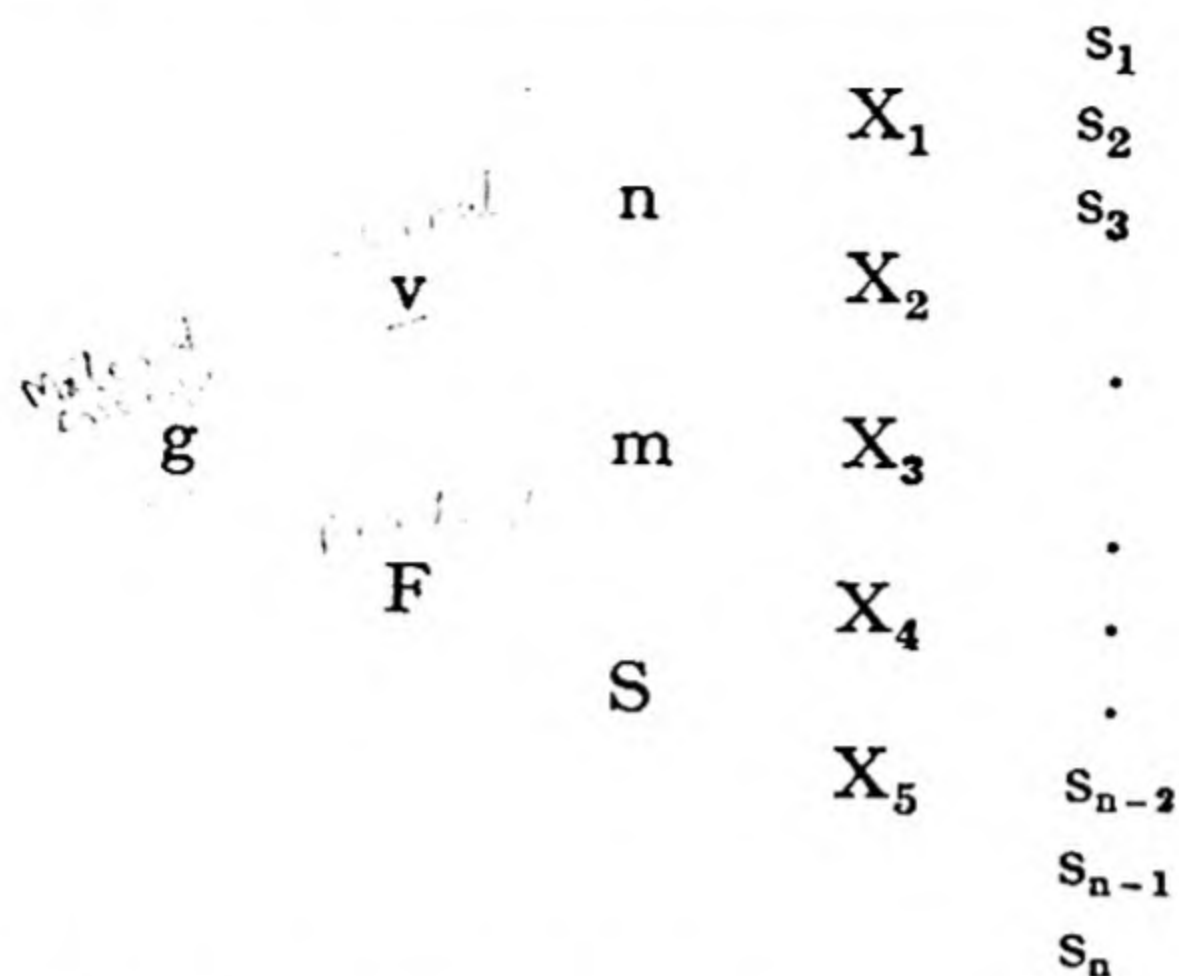
factors in mind which determine thinking power. Professor Thorndike, whom we may take to represent this school of thought, has suggested that there is first of all verbal intelligence which determines, presumably, a person's capacity to learn in the ordinary academic sense ; there is, second, practical intelligence which enables a person to think in concrete situations, a power presumably unitary and independent of verbal intelligence ; and there is, third, social intelligence, again presumably independent of the others, which determines a person's capacity to act intelligently in dealing with people. This oligarchic theory has no king. ( These three types of human intelligence are held to be of relatively equal importance, each in its own sphere.) ( The third theory is the anarchic theory, of which Professor Thomson may perhaps be taken as the leading exponent, and which suggests that both the preceding views are wrong ; that the mind comprises a large number of special abilities and that general intelligence is at best merely a sampling of these specific abilities. The different types of intelligence suggested by

Thorndike would therefore be samplings taken in different areas of the mind, yielding different groupings of the specific abilities.

Professor Spearman meantime had enunciated his now famous two-factor theory, which accepted the existence of the general factor and suggested that, in combination with different specific abilities, it determined human thought. The two-factor theory is now sufficiently widely known not to require expansion here. My purpose is to suggest that each of these theories is partially true, but not wholly true. Recent research seems to indicate that the mind is essentially hierarchic; that there is a general factor and to that extent the fundamental point in the work of Professor Spearman is true; that there are certain broad group factors and that there are a large number of specific factors.<sup>1</sup> This may be presented diagrammatically as follows:

<sup>1</sup> The Spearman school would argue that the two-factor theory includes group factors. If an action is dependent on say,  $g$  and  $v$  and  $n$  and  $s$ , is it reasonable to say two-factor is still the appropriate name?





In this diagram "g" is placed on the left in isolation, as a general factor which we may call general mental energy, which plays some part in all the responses of the individual. Sometimes it may be very important, sometimes not so important, but it is always present. It is the "g" factor of Spearman, which has been so firmly established by his work and that of his students, and so completely corroborated by all subsequent research. "v" represents the verbal factor which plays its part whenever words occur. "F" represents a practical factor which plays



a part in all concrete situations, in all practical planning and doing. These two factors are placed after "g," indicating that they are of considerable breadth, occurring in many situations but not in all, and therefore not of the same breadth as "g." The factors which follow, "n," a number factor, "m," a mechanical factor, and "S," a factor of spatial ability, are still narrower, and play a part in an even more restricted field. The five "X" factors are submitted as five independent factors in character, not located in very detailed fashion so far; they will be discussed more fully later. The small "s" factors, "s<sub>1</sub>" to "s<sub>n</sub>" represent the large number of specific factors, each playing a part in a very restricted sphere.

I believe that any human ability can be described in terms of these factors, all of which are independent one of another. In general, academic ability is a combination of "g" and "v," and different types of academic work may demand more "g" and less "v" or more "v" and less "g." For example, in the study of English, "v" is found to be relatively more important than "g"; while

in the study of Mathematics, "g" is relatively more important than "v," and "n" also plays some little part. This will be discussed in greater detail subsequently. What we normally call practical ability is a combination of "g" and "F." It will be noted that with this definition, academic ability and practical ability have something in common, viz. "g," the common factor. To that extent a person good in one sphere tends to be good in another. But they have, too, something quite independent, and to that extent a person may be good in one and not at all good in the other. This definitely destroys the idea that if a boy is poor in academic work he is likely to be better in practical work. He may be better, but equally he may be worse. The amount of "F" which a person has is independent of the amount of "v" he has, and also of the amount of "g." If a boy has high "g" and high "v," he is a good academician. If he has high "g" and high "F," he is a good technician. It is as if "g" determines the *level* of his learning and thinking power, and "v" and "F" determine the *type* of his

thinking. It will be our purpose to discuss the significance of these individual factors in considerable detail later, and in particular to discuss the significance of "g," "v" and "F" in educational work.

Meantime, it is suggested that this hierarchic theory is the true psychological basis of education ; that the purpose of education is essentially to ensure that the methods and materials used will be in accordance with the multiple factor pattern of the individual child; that the school structure should be organised to allow both for differences in *degree* of human ability according to the level of "g" and for differences in *type* according to whether a child has more "v" or more "F," is naturally a verbalist or naturally practical. (The aim of the school must be the matching of attainment to capacity in each of its pupils, a capacity defined in terms which are psychologically meaningful.)



## THE SIGNIFICANCE OF INDIVIDUAL FACTORS

### *Factors "g," "v" and "F"*

IN discussing the nature and significance of the factors comprising the hierarchic theory, let us take the first three together. "g" has already been defined in accordance with Spearman's work, as general mental energy. "v" is a verbal factor and "F" is a practical factor. It will perhaps help to make clear the significance of these factors if we discuss their relationship to functional abilities.

What is usually referred to as academic ability is a combination of "g" and "v." It has been suggested that the relative importance of "g" and "v" will vary in the study of one academic subject as compared with another. It is probably true, for example, that in the study of English "v" is relatively more important than "g," whereas in the study of Mathematics "g" is relatively more important than "v."

What is usually referred to as practical ability is, similarly, a combination of "g" and "F." At this point we may well ask which of these two abilities is intelligence. It is almost certainly true that in the minds of most people the term intelligence has a meaning more or less synonymous with academic ability. It is, however, more in keeping with the facts to think of intelligence in terms of "g," if by intelligence we mean innate capacity. The amount of "g" a person possesses is the measure of his *general* capacity. If he has more "v" than "F," then that capacity will find its normal manifestation in an academic sphere; if, on the contrary, he has more "F" than "v" it will find its manifestation in practical affairs and in technical pursuits. The assumption that a technician is less intelligent than an academician, simply because he has difficulty in expressing himself in words, is a denial of the facts, but it is none the less true that the children of this country have suffered because of our acceptance of the idea that intelligence was a matter of words. The theory which is now being

discussed denies that that is so. The following analogy may serve to illustrate the theory. Let "g" be the measure of the level of water in a tank; from the tank there are two systems of pipes, the hot water system and the cold water system. Let us call the hot water system the verbal outlet and the cold water system the practical outlet. If we turn on the hot water tap and find there is only a limited flow of water, we may draw one of three conclusions: first, that there is little water in the tank; second, that there is a blockage in the hot water pipes; third, that both of these causes are present. We are not, however, entitled to conclude that there is little water in the tank on that evidence alone. Yet surely that is just what has been done in the schools. The boy who cannot succeed in academic work is presumed to be unintelligent, the conclusion being drawn that there is little water in the tank. If we turn on the cold water tap in these circumstances and find there is a substantial flow, it is obvious that there must be water in the tank. There is a question at this point full of interest for education. Is it reasonable to



suggest that we may draw cold water from the tank and heat it? Is it reasonable to suggest that the boy with a fair amount of "g" and of "F" may, in fact, be taught what are normally thought of as academic subjects without the use of words, or at least with only such limited use of words as he is able to manage? I believe that the greatest contribution to education at the moment would be the development of what I call "F" methods, which would enable those pupils who lack "v" but who have "F" to make their "g" manifest by an "F" approach. Let us consider this in the sphere of mathematics. To prove that the square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the other two sides, we may employ two methods, one verbal and the other practical. For verbal pupils the appropriate method will be the extension of the necessary lines and the completion of the necessary diagrams which enable comparison of triangles to be carried out. I am not suggesting that this proof is not completely adequate. I am suggesting that it would be equally adequate for practical pupils to cut

out the appropriate areas and match them one to the other, thus coming to the same conclusion without the use of words. I have often wondered whether any really good mathematician ever uses words in solving a mathematical problem. It is obvious that he must use words in telling other people about it, but it is one thing to solve a problem and another thing to tell people how it is done.

I believe that an appreciation of the distinction, not merely in *degree* of ability but in *type* of ability, is fundamental in the educational process, and I shall return to the point subsequently. Meantime, it should be noted that in order to stress the importance of a realisation of the fact that intelligence is not a matter of verbal ability only, it is proposed throughout these lectures to avoid the use of the term Intelligence Quotient and to refer instead to Verbal Quotient (VQ), being a measure of "g" and "v" in combination, and Practical Quotient (PQ), being a measure of "g" and "F" in combination.



*Factors "n," "m" and "S"*

These factors are placed as they are in the diagram to indicate that they are narrower than those we have already dealt with, i.e. they play a part in fewer situations.

"n," the number factor, is one which has long been recognised in educational practice ; together with "g" and "v" it constitutes mathematical ability. The person with high "n" is specially good in arithmetic, but it is obvious that unless high "g" and "v" accompany high "n," the ability will be restricted to more or less mechanical arithmetic and will not allow of any form of advanced mathematical thinking.

"m" is a factor of mechanical skill used in the sense of skill in execution. A boy with high "m" makes a good mechanic. The difference between "F" and "m" is that between the person who can plan and the person who can execute in a practical sphere ; it is the difference between the architect and the builder, between the designer and the fitter.

The factor "S" has been referred to in recent research work as a spatial factor, but

too little is known about it to warrant any detailed discussion in these lectures. It appears to consist in the imaginative manipulation of spatial relations and patterns.

### *Factors in Character*

Next we come to the five "X" factors, and here, indeed, we are in a sphere where much investigation has yet to be done. It is true that there are a large number of adjectives in the dictionary which describe character. Does that mean that there are a large number of independent factors in character, or does it mean that these words are used to describe different combinations of a smaller number of independent factors? From the relatively limited research which has been carried out, it is reasonably certain that the number of independent factors in character is quite limited and probably not more than five. The location of them has yet to be determined, but of one we can speak at some length. This one has been proved to play a very important part in determining success in school work, and elsewhere<sup>1</sup> I have called it "long-term

<sup>1</sup> See *Intelligence, Concrete and Abstract*, Cambridge University Press.

persistence." It is not measured by mental tests, which, of course, are short-term affairs. It is the factor in character which enables a person to try and to keep on trying. A boy who has high "g" and high "v" but who lacks " $X_1$ " has plenty of ability but will find it difficult to make that ability manifest to its full capacity. As a student he may show occasional flashes of brilliance but may fail to fulfil expectations over a period of years; a boy with less "g" and "v," and therefore a more limited academic ability, who has high " $X_1$ " may prove more successful as a student. We shall have occasion to give actual figures relating to this question later. Meantime, it is enough to note that success in school or out of school probably depends more on this factor in character than it does on actual ability. We should make clear, of course, that it is a relative matter; no matter how much " $X_1$ " a child possesses, if he lacks "g" his level of attainment must necessarily be limited, but given enough "g" and "v" in academic work, or enough "g" and "F" in practical or technical work, then those who have a



high value of " $X_1$ " are those who will succeed.

### *Specific Factors*

Finally, we have specific factors, large in number but each playing a part only in special circumstances. While in a particular situation one or more of them may be of great importance, in the general work of education it is difficult to take them into account and for that reason it is not proposed in these lectures to discuss them in any detail. It is important, however, to note that when we find a pupil of low " $g$ " and low " $v$ " and low " $F$ ," it is only by tapping the potentialities of the specific factors that we may find the response we seek ; perhaps in music, or in art, or in some other special sphere we may find a means of education, where other approaches fail. It is the existence of these specific factors which justifies the statement sometimes made that everybody is a genius at something if only we can find that something.

Having regard to the fact that the work of schools is a matter of general education, it

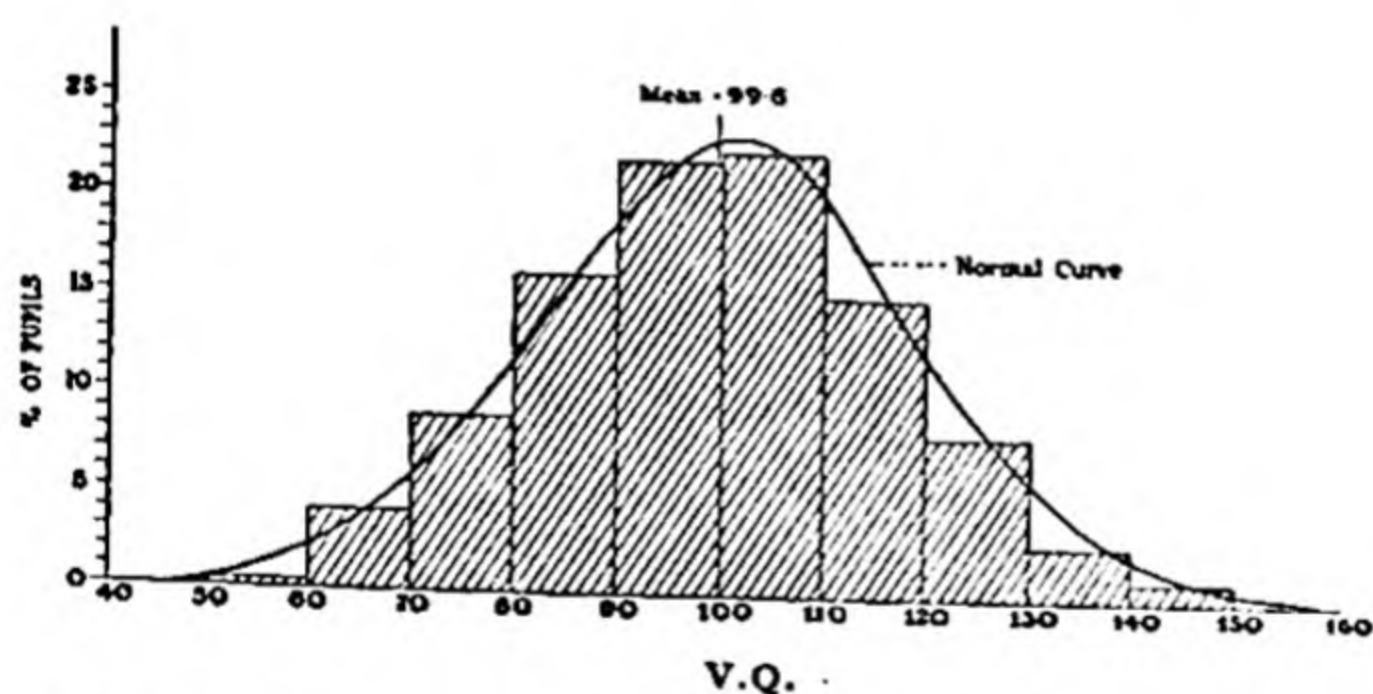
follows that the importance of the factors discussed above decreases as we move from left to right across the diagram, and for that reason the concept that is here being stressed may not improperly be termed the "g, v, F theory." The point of major importance to keep before us is that there are two types of ability of considerable breadth, and that according to whether a pupil possesses more "v" or more "F" the whole educational approach should be determined. It should be borne in mind, too, that this is a matter not so much of curriculum as of *method*. The "gF" pupil will not be receiving his appropriate education if the only adjustment made is an increase of practical work. What is necessary is that the whole educational approach for such a pupil should be of a practical nature, in the academic subjects as well as in the technical subjects. His education will come from reality, not from books.

### *Individual Differences*

So much has already been said on the subject of individual differences that it is

## SIGNIFICANCE OF INDIVIDUAL FACTORS

perhaps unnecessary for me to spend much time on it. The fact that general ability is distributed widely amongst children of any particular age is generally accepted ; the fact that the distribution follows the line of a normal curve is also well known. It is important to realise, however, that such a distribution would also probably result for "v" and for "F." I will give you at this point the actual distribution curve obtained from the test results of 2,000 children aged eleven.



These results were obtained in Walthamstow in 1935.

The wide range of ability among children of the same age indicated by these figures



makes us realise that the possibility of all the children in one class of the same chronological age being successfully educated is low indeed. Here we find children aged eleven varying in ability from that of the average seven-year-old to that of the average fifteen-year-old. Any teaching method or rate of progress imposed on a group of children varying to such an extent must inevitably be too fast for some and too slow for others. In this connection I hold very strongly the view that in days gone by those who have suffered most because of this difficulty have been the bright children, not the dull children. The greatest possible national loss must result if we continue to allow the boy of eleven who is mentally fourteen or fifteen to proceed at the rate of one mentally eleven. If this occurs, then the boy is really four years retarded, since to that extent his attainment is lagging behind his natural capacity. We have been too much concerned with the problem of the backward child and not nearly enough concerned with the problem of the retarded child. Probably 90 per cent. of backward children are backward because they are dull, and if

their backwardness is not greater than their dullness their education is proceeding quite satisfactorily. But it is rare indeed to find a bright child whose attainment is in accordance with his brightness.

I shall return to this problem of backwardness and retardation subsequently ; meantime, I ask you to bear in mind the wide range in ability amongst children of the same age, and to note that this range in ability is true in terms of " v " and " F " as well as of " g." All three of these factors appear to reach maturity at about the same time, i.e. at fifteen to sixteen years of age, which means that potentiality, whether academic or practical, is as great at fifteen to sixteen as it will ever be ; but the process of making the capacity manifest, of acquiring through it a body of knowledge, goes on during the whole of lifetime.

### *Methods of Measurement*

Let us now discuss the methods used in the measurement of these factors. Almost all so-called tests of intelligence at present on the market are tests not of a psychological



factor but of a functional ability ; in other words, they are tests not of " g " alone, but of " g " in combination with one or more other factors. The verbal tests are measures of " g " and " v " together. Because of the fact that each of these tests varies in the extent to which it calls upon " g " and " v," the results obtained by administering several of them to any one pupil will show disagreement. This disagreement is often taken to indicate that the tests themselves are not reliable ; what it does indicate, however, is that the tests are measuring different relative amounts of the same two factors, and it is to some extent a weakness, since one of the first principles of measurement is to measure one thing at a time. It is specially serious when the relative loadings of " g " and " v " in any particular test are not known. An analogy may help us to appreciate the difficulty. Let us imagine that we have to select men for admission to the police force on a basis of physical suitability. We work out a physical index by combining the appropriate chest measurement with the appropriate height and obtaining a single figure to which the men

must conform. On reviewing the new squad we ought not really to be surprised to find it includes some tall, thin men and some short, fat men. And this is exactly what happens when tests are used ostensibly to measure "g" but actually measuring "g" and "v" in unknown relative amounts, and, even more so, when measures of attainment and of capacity are used and the results combined, where measures of capacity alone should be the appropriate criteria.

Ideally, we should have separate tests of each factor, but since this is impossible the alternative is to have tests of "g" and "v," in known relative amounts, and of "g" and "F" in known relative amounts. An example of a test of "g" and "v" with the two factors equal in relative amount is the *Thanet Aptitude Test*, published by the University of London Press. *The Simplex Test*, published by George G. Harrap, appears to have very similar loadings. Other verbal tests which have been published have not, so far as I am aware, been accompanied by information relating to the factorial loadings. Many of them are, of course,

satisfactory in use for the purpose for which they were designed. Tests of "g" and "F" are less common, and there is only one scale of tests in which the loadings in "g" and "F" are given. This scale has been described in the appendix to a monograph, *Intelligence, Concrete and Abstract*, published by the Cambridge University Press. The famous Binet-Simon test, and in particular the Stanford revision thereof, which is in standard use as a basis of certification of mental defect and for many other purposes, is a measure of "g" and "v," and of "F" to a small extent if certain alternatives are used, but essentially of "g" and "v." There is no reasonable doubt that, as a result, children are certified defective who are defective not in "g" but only in "v"; when tested with a "gF" test they are proved to be not defective, and in some cases the standard of attainment they can reach when taught by "F" methods is adequate evidence that the basis of certification may be gravely at fault. In this connection, those interested are referred to the excellent work which has been done at Lankhills Special School, Winchester,



where Mr. Duncan, the Headmaster, has for some years been putting into practice with certified defectives the educational methods which it is the purpose of these lectures to set out.



## SCHOOL ORGANISATION BASED ON THE HIERARCHIC THEORY

FOR the past ten or more years the organisation of the elementary schools in this country has been undergoing revision. The Hadow Report is the basis on which school organisation is being remade. While in general I am entirely in agreement with the Hadow Report, there is one point to which I must draw attention. The report was written at a time when the evidence was strongly in favour of the belief that ability was a matter of " g " alone and that difference of *degree* was the problem which the organisation of the schools must take into account. The evidence now available suggests that this is not enough; that differences in *type*, whether verbal or practical, must be taken into account. Indeed, it is suggested that the A B C D classification, based on degree of ability, which is in most cases, if not in all, made on the results of verbal tests, is an acceptance of the idea that intelligence is a matter solely of words. This assumption cannot too strongly be denied.

Such classification creates a special problem of the backward child, since it decrees that the lowest class shall contain not merely those children who lack "g" but also those who lack "v" and who may be average in "F." This situation is bound to arise where the teaching methods and the method of classification are based on purely verbal approaches.

I suggest that the appropriate basis of classification is the "g, v, F" concept, taking into account the degree of "g" which the pupils possess and also whether their "g" finds manifestation more easily through "v" or "F" methods. This is the basis, too, of the case for secondary technical education at technical high schools, as they have been called in the Spens Report. Many children with high "g" and limited "v" must, in the past, have been wasted in secondary academic schools; they have been mediocre academicians when they might have been brilliant technicians. Since "g" is independent of "v" and of "F," it is essential that pupils of high "g" who have higher "F" than "v" should be selected

at the appropriate age for admission to a school, technical in type and equal in status and in level of attainment to the secondary academic school, or grammar school as it will hereafter be called in these lectures.

In the senior modern school this differentiation by type is no less important. Instead of classifying, in a four-form entry school, into A B C D forms, in accordance with the Hadow Report, I suggest that the classification should be Av, Bv, AF, BF. As the setting up of such forms would present certain difficulties, I will deal with each of them separately.

The Av form is relatively easy to arrange. It will contain children above average in "g" and naturally verbalists. The curriculum and method of approach necessary are well known to the teaching profession and are, in fact, the basis of the whole of the training for the teaching profession as we now know it. A reasonably high standard of academic work may be expected from this form. The Bv form will comprise children below average in "g" but still verbalists, and here again



there is no difficulty. The method will still be verbal but the pace and the gradient must be modified. The process of modification must not take the form of decapitation. In preparing the syllabus for the Bv form, the correct procedure is not to take the syllabus of the Av form and merely reduce the amount of work to be covered. Too often this is the procedure which has been adopted in dealing with the so-called "C" child; in the history syllabus, for example, the procedure has been to go only so far as, shall we say, the fifteenth century instead of the whole span of history. Such a policy does not provide the solution to the problem. What is needed is a recasting of the entire syllabus, with the realisation that we may have to wait until a later chronological age before beginning certain work with these pupils. To illustrate from an earlier stage in education: the average child will begin reading at about six years three months; the bright child, such as we find subsequently in the Av form, can therefore begin reading probably at five years, while the slower child, to be found later in the Bv form, will probably not begin



reading until the age of seven. To begin before the child is ready is not helpful, and may indeed give rise to the situation where the child himself believes that he is unable to read, whereas all that is wrong is that he is trying to do something for which he is not yet ready. The same principle applies in the senior school. The type of literature selected for the Av form should differ considerably from that selected for the Bv form. At the age of, say, twelve years, the pupils in the Av form will have an average mental age in terms of "g" and "v" of something in the region of  $13\frac{1}{2}$  to 14, while those in the Bv form will have an average mental age in the region of  $10\frac{1}{2}$ . Due account must be taken of this fact.

It is when we come to the AF and BF forms that our real problem arises. The AF form will comprise children above average in "g" and with more "F" than "v." They are the intelligent children who must be approached in a practical way. Their study of mathematics will depend on practice rather than on book work; it will involve the making of clinometers, surveying, and so on;

it will be applied mathematics rather than pure mathematics. So it must be in all their study. Whether or not these pupils should study *subjects* at all is a question which will be discussed later. The teaching method will be essentially that used in the junior technical school, and it is not without interest to note the quite remarkable results which these schools have achieved, despite the indifferent human material which has found its way into them because of the failure to provide technical education on the same status as academic education.

The BF form, comprising children below average in "g" but more practical than verbal, will probably be the most difficult form to serve adequately. The approach must still be practical, but the syllabus must not merely be a decapitated version of the AF syllabus; it must be prepared specially. Here there may be a case for an increase of actual practical work because these children will find in such work the means of general education. They will learn most of their arithmetic in the school garden and their essay writing will be improved if it is

confined to subjects in which they have actual experience—if you like, to description and narration; their mathematics, simpler in form than that of the AF form, will grow out of their need for it in the jobs of work which they must do; in printing they will probably find the basis for English, and so on. The great need will be for teachers who can use what we may call BF methods. I have said on occasion, half in jest and wholly in earnest, how badly the “BF” form will fare if it is provided with a “BF” teacher.

To be serious, is it not true that the whole question of the training of teachers becomes involved at this point? Have we not made the tragic mistake, because of our confusion of intelligence with academic ability, of selecting verbalists, sending them to secondary schools, teaching them by verbal methods, sending them to training colleges where more verbal work is undertaken, and turning them out as teachers so impressed with the importance of words that they are unable to educate “F” children? Indeed, is it not true that because of this we have produced teachers so



good at "*teaching*" that the children have very little opportunity to *learn*? If by teaching we mean lecturing—and all too often this is what teaching in schools reduces to—then the "F" child learns very little. There is a general tendency at the moment to accept the suggestion that children learn by doing, and there is no child of whom this is truer than the "F" child, and, in particular, the "F" child of less than average "g." Have we the teaching personnel to carry into effect a school organisation as set out above? If not, then we must review our procedure for the selection and training of teachers.

In a four-form entry school it is a simple matter to arrange classes on the Av, Bv, AF, BF basis. With three-form entry some modification is necessary. Here the A form will contain pupils of more than average capacity, whether manifest in the verbal or in the practical sphere; there will then be a Bv form for the verbalists with less capacity, and a BF form for the practical pupils with less capacity. Actual results obtained from the classification of a school in this way may here be given. The school was of



the three-form entry type, organised in accordance with the Hadow Report into A, B, C streams. The A form had an average VQ of 110; the B form, an average VQ of 99, and the C form of 84. In the C form there were 26 pupils classified as dull and backward, this in an age group of 105 children. Performance tests were administered and the age group was reclassified as follows :

*A form*, with an average VQ of 108 and an average PQ of 114. The A form, therefore, was as good verbally, for all practical purposes, as the previous A form, and had the added virtue of new children above average in practical ability. Here, therefore, is a form capable of good all-round work in general education if methods both verbal and practical are used.

*Bv form*, with an average VQ of 99, and therefore quite as good as the previous B form, and with an average PQ of 87. It is to be noted that with this Bv form nobody would think of suggesting that the approach should be mainly or wholly practical; if it were made so, quite a number of its members

would appear to be dull and backward. The appropriate approach is through verbal methods, and the form will be average on the whole.

*BF form*, with an average VQ of 87 and an average PQ of 104. Here again it is not reasonable to suggest that this form should be taught by verbal methods, since if it were many of the children would appear to be dull and backward. Surely it is obvious that the form must be taught by practical methods, so that the potentiality indicated by the average PQ of 104 may be realised, and the form as a whole may be average.

As a result of this classification, it was found that there were six children, three in the Bv form and three in the BF form, who could truly be called dull and backward, so that in this instance the problem of backwardness in the age group was reduced from a matter of 26 pupils to merely six pupils. The whole subject of backwardness will be dealt with at greater length subsequently.

For a two-form entry school we are faced with two alternatives: we must classify either by degree of ability or by type of

ability, since we cannot do both. In my opinion it will be much better to classify by type, and carry the whole range of "g" in one form, setting up a "v" form and an "F" form. If this is done the basic approach will be the same for all children in one form, allowance being made, of course, for the different rates at which the children in the form can progress. I believe that such an arrangement, which only involves differences of degree of ability among the children in each form, will be better than one involving differences of type and of degree. Whether this will prove to be the case is a matter for experiment. The two-form entry senior school is really too small to allow of appropriate classification, and a great deal of individual work will be necessary.

Finally, a word should be said on the practical procedure to be adopted where classification as indicated above is in force. A group test of "g" and "v" in combination can readily be run before the children pass on to senior schools, and the results made available on their arrival. This enables a normal Hadow classification to be made, until



the final classification is complete. A member of staff should then be delegated to give an individual performance scale to each member of the first-year group; this will probably take two or three weeks. There are then available two sets of test results, the VQ and the PQ for each pupil. Any adjustment necessary to make the two figures comparable should be made before classification is attempted; that there will be a difference in the averages is almost certain, since the creaming for secondary school admission will have taken away the best verbalists and will probably have left those highest in "g" and "F" behind. Subject to this correction, we have two comparable figures for each pupil, the VQ and the PQ. In a four-form entry school, the next step is to separate the children with a higher PQ than VQ from those who have a higher VQ than PQ. The numbers will normally prove to be about equal in each group. Each group has then to be divided into two forms, an A and a B. The whole of the classification can be undertaken in less than a month from the beginning of the first term, and, of course,



adjustments may be made as and when they prove necessary. In practice this has been done in senior schools without difficulty. The use of a performance scale is a relatively simple matter and only one point is to be noted. It will be best that one member of staff should undertake the whole of the testing, in order that uniformity of procedure may be maintained.

The whole subject of school organisation as it is affected by the hierarchical theory reduces really to a simple statement which has already been made and which I will repeat. School organisation must not merely take into account differences in the *degree* of ability of the pupils ; it must also take into account differences in *type* of ability. Children are not merely more or less intelligent ; they are intelligent in different ways. Some think in words and learn from books, others think in a more concrete way and learn by doing. Classification must make allowances for this difference, which is fundamental to organisation and to method. Too many children have in the past been sacrificed on the altar of purely academic teaching.

## THE BACKWARD CHILD

It has often been said that one of the effects of Hadow reorganisation has been to throw into relief the special problem of the backward child. It is true that a great deal of work has been done in the last ten years to make clear the extent of the problem. Undoubtedly the most complete single volume on the subject is the excellent book by Professor Burt, recently published under the title of *The Backward Child*. It has been made abundantly clear that the problem is not a simple one, and that nearly always the cause of backwardness is complex rather than simple. While we are bound to agree that that is so, it remains true, as has been stated by Burt among others, that the fundamental cause of backwardness is *dullness*. It is to be noted that the term backwardness is always used in terms of academic subjects, and in the same way the term dullness is always used in terms of academic ability, i.e. in terms of "g" and "v." In general, it has been agreed that a child with a VQ between 70 and 85 should

be termed dull and that a child whose attainment quotient is between 70 and 85 should be termed backward. In so far as there is very substantial agreement that the fundamental cause of backwardness is dullness, it is proposed in this lecture to deal especially with this aspect of the problem.

I am of the opinion that to a large extent the backward child is not a *special* problem. I believe that the problem of the education of such a child is the same as the problem of the education of all children, and that is the matching of attainment to capacity. If a child has a VQ of 80 and an attainment quotient of 80, then the relationship between his attainment and his capacity is entirely satisfactory, and although he is dull there is no special problem. If, however, we find a child of average VQ whose attainment quotient is below average, we have a child who is backward but not dull, and a problem does arise. The many causes which may contribute to this situation, such as absence from school, or some physical defect such as partial deafness, are adequately discussed by Burt. It is suggested that all remedial cases,



i.e. those cases where the cause of backwardness is not dullness, should receive special attention.

The major cause, however, of probably 90 per cent. of backward children is dullness, and to that extent it is not remedial. The dull children will be backward ; indeed, from a purely educational point of view, they *should* be backward. They should be just as backward as they are dull. It is for that reason that I say there is not a special problem. The important thing, it seems to me, is for teachers to realise that they should not, and indeed cannot, make the dull child average in his academic attainment. Teachers have for too long felt it their duty to strive to make these children what they have chosen to call "normal." I should like to say a word on the subject of normality. I suggest that there is no such thing as a normal child. The definition of a truly normal person would presumably be one who is average in height and in weight, in verbal and in practical ability, in character and in temperament—in fact, in all respects. It is obvious that such a person would be rare



indeed, and, for myself, I can think of no greater insult than to be called normal. I like to feel that in some respect at least I am above average, and in so far as that is true, I am not normal. Let us agree, then, that there is no such thing as a normal person in this sense ; let us realise that children do not fall into clearly defined groups such as backward, normal, bright and so on. The curve of distribution for all abilities is a continuous curve ; it would be impossible to distinguish between the brightest of the average group and the dullest of the bright group, or between the dullest of the average group and the brightest of the dull group. To do so is to suggest that there is some fundamental difference between the child with a VQ of 86 and one with a VQ of 85. We have failed, I suggest, to appreciate that the curve is continuous and that the lines drawn in classification are artificial ones, that there is no difference in kind between the backward child and the average one, that the difference is merely one of degree of ability. It is well to bear this concept of continuity in mind in other respects.

The problem, then, of the backward child is really twofold; first, to separate the children who are backward but not dull and to take steps to diagnose the cause of the backwardness and if possible to remedy it. It may be there is a special defect in reading, for example, and that carefully arranged exercises may overcome the difficulty, or it may be that the child, through absence from school, has missed an important series of lessons which has affected all his subsequent work. In a clinic in which I once worked, I came across a boy of twelve reported to be quite good at school work in all respects except in Arithmetic. He simply could not count. On investigation, it was found that the boy had been away from school and had never been taught subtraction; he could multiply and divide and add, but he could not subtract, with the result that a large proportion of his arithmetical calculations were wrong. Being a reasonably bright boy, he had been moved up on his return from absence to the next class, and as he progressed up the school he had increasingly been told that he was bad at Arithmetic, so that by the

time he was twelve he was himself convinced that he was bad at Arithmetic. To teach him subtraction was a simple matter ; to overcome his belief that he could not do Arithmetic took some time. I have often wondered why we fail to realise that when children return to school after an absence they require to be put into a special group for a while, where they can cover the ground they have missed. When we are sick in body, we are allowed a period of convalescence before we return to the full working load ; so children who have been away from school require a period of convalescence before going back into the routine of school work.

Secondly, we have the group where the backwardness is not remedial but is due to dullness. Here it is a question of accepting that these children are not average and never will be average ; that their attainment will be, and should be, just as much below average as is their capacity ; that the teacher's job is not to undertake special coaching in the ordinary academic subjects, in the hope of bringing the child's attainment up to normal. What nature has omitted in the capacity of



the child it is surely presumption for a teacher to try to provide. Dullness is not a temporary state ; human attainment is very largely determined by human capacity, and the child's relative brightness or dullness remains constant in later years. It may be a sad reflection, but it is none the less true that the dull child will be dull as an adult. There is, however, a very genuine ray of hope in the realisation that the definition of dullness we have so far accepted is in terms of " g " and " v " only. In so far as " F " is independent of these two factors, it may be that some of the children in this group will prove not to be dull in terms of " g " and " F." This hope is one to which expression has been given on many occasions. The belief that the backward child is necessarily better at practical work than he is at verbal work and that the solution of the problem of backwardness is to be found in giving him practical work is, however, quite untenable. The child who is backward in verbal work may be even weaker in practical work, or he may be just as bad in one as in the other, or he may be better. My suggestion therefore



is, not that all backward children would not be backward if taught by an "F" approach, but that those of them who prove to have a higher PQ than VQ will be less backward if taught by practical methods.<sup>1</sup> I am anxious to make this quite clear because of the confusion which at present exists. Burt himself gives results of tests in manual subjects administered to dull and backward children, and from these results he draws the conclusion that the backward child will occupy a place in manual subjects midway between the normal child and the defective child. In my opinion the results he obtained did not justify that conclusion ; his backward children had an average ratio in manual subjects of approximately 90 whereas in verbal subjects they were about 10 per cent. weaker. These figures are entirely in accordance with the factorial theory which is here being discussed ; in general, dull children will have

<sup>1</sup> Throughout this book it is assumed that any variation in standard deviation as between VQ and PQ has been taken into account. In other words, our use of VQ and PQ, etc., assumes that the standard deviations of these ratios have been equalised. The reasons for this step can be found in any text-book on statistics.

a mean value in terms of "g" and "F" below the average of all children and it is obvious that this must be so because of the fact that "g" is common to the VQ and to the PQ. That there is a higher value in terms of "g" and "F" than in terms of "g" and "v" is due to the independence of "v" and "F" from "g." Burt's conclusion, therefore, that there is no difference in type between the practical and the verbal is one with which I disagree. It is to be noted that he makes no claim to certainty in this matter, as indeed he could not, since research on the subject had yet to be done when he was writing that chapter. He also states that "something like a manual type and a verbal type can here and there be distinguished." A realisation of the factorial nature of verbal ability and of practical ability provides the answer here.

It would be interesting to know how many of the children who are dull and backward in terms of verbal work would not fall into that category in terms of practical work, in terms of "g" and "F" both in their capacity and in their attainment; how many of them are

backward because we have taught them by methods which were not appropriate to their factorial make-up. According to the figures to which I have made reference earlier, it seems possible that instead of some 15 to 20 per cent. of an age group being classified as backward, only 5 to 10 per cent. would be so classified as a result of appropriate class organisation and teaching method. The most extensive practical experiment conducted in this sphere was at Lankhills Special School, Winchester. Here there are a hundred children certified mentally defective. They have been certified essentially on the basis of results in a verbal test and have a VQ between 60 and 70. Retested in terms of "g" and "F," all those proving better in "g" and "F" than in "g" and "v" have been taught by "F" methods. The results are so striking that one is bound to wonder what results could be obtained with children with a VQ between 70 and 85 if the same methods were adopted. Some of these children who have been certified mentally defective are able, before they leave Lankhills, to do invisible jointing in wood; they can do a series of folk dances



with poise and rhythm and without a trace of mistake ; from written instructions they can make cardboard models of, for example, a garage ; they can take measurements of an actual piece of furniture, reduce it to scale, make a cardboard model and then a model in wood—and so on. The standard of work produced and, even more important, the whole attitude of the children are not those of mentally defectives ; nor, in fact, are they defective in terms of “ g ” and “ F.”

I suggest that a substantial number of so-called dull and backward children are only dull and backward in terms of verbal work. We have turned on the hot water tap and have struggled to increase the limited flow which is due, in this case, to a blockage in the pipe. Our procedure must henceforth be to turn on the cold water tap and make the fullest use of the stronger flow which will result in these cases. The need is for a development of methods and curriculum suitable for these children, not by modification from above but by building up from below. A study of the methods used at Lankhills Special School and their appropriate modi-

fication for the greater ability which would be found amongst the children in the backward group is, in my opinion, more likely to result in the correct approach than is the method now used of scaling down the methods and curriculum used with the average group ; for is it not true that this process of scaling down is the fundamental cause of the academic tradition of the elementary schools ? The selective central schools imitate as far as possible the grammar schools ; the senior modern schools strive to attain an academic standard not out of keeping with that of the selective central schools ; the B form struggles to reach the standard of the A form and the C form clutches vainly at the tail of the B form, and all the way through the medium is words. A most interesting situation was found at Lankhills after a comparison between the children's PQ and VQ and their survival value in life after leaving the school. When the verbal test results were compared with the capacity of the children to earn a living afterwards, it was found that there was practically a zero correlation.

In other words, the academic ability of these children, or if you prefer it, the verbal intelligence, is no measure at all of their capacity to live in society. On the other hand, the performance test results yielded a very high correlation indeed with survival value afterwards. Such a discovery is not really surprising. At least for these children life is a practical affair, not an affair of words ; their survival value in life will depend on their practical ability rather than on their verbal ability. I wonder to what extent this is true, not merely for these children but for the average child and for children above average. For how many of the population is life an academic affair ? For how many is it a practical affair ? Is it unreasonable to suggest that for 90 per cent. of the population life is practical and that their survival value will therefore be determined by their practical ability, not by their verbal ability ? I wonder to what extent this is the explanation of the situation where the supposedly dull child at school afterwards becomes a business success. In some cases it is true, of course, that such a child is presumed to be dull



when, in fact, he is not dull at all, when the school has merely failed to realise the capacity which was there, for one or more of many reasons ; but in some cases it is probably true that because of the academic tradition of the schools, the child lacking " v " but probably of average or even more than average " g " and " F " is accepted as being something of a dullard, but on leaving school proves to be far from dull in the practical affairs of life. Life is largely a matter of " g " and " F," and not of " g " and " v." What we must realise is the need for reclassification. Some of the dull and backward children will be just as backward when a practical approach is used and others may even be more backward. But a number of them will be much less backward. Here more than with any other group there is need to take into account the possibility that we have created a problem of backwardness because we have used only one method of approach, when we have wrongly defined dullness in terms of words only while, in fact, the true definition of dullness would be lack of ability both in words and in the practical

sphere. The dull child would be the child for whom neither approach yielded reasonable results. On the figures I have so far obtained, I believe that probably something between 5 and 10 per cent. of children would satisfy this definition of dullness ; certainly a substantially smaller number than that satisfying the narrow definition which assumes that intelligence is solely a matter of verbal ability.

The problem of backwardness is closely related to a precisely similar problem at the other end of the scale, the problem of the bright child. It seems to me that at present the only children who are deemed to be bright are those bright in academic ability. It is obvious, however, that just as some of the dull children are not so dull when taught by "gF" methods rather than "gv" methods, so some of the bright children would be much brighter on the "gF" side than they are on the "gv" side. Some of the children who are mediocre pupils at the grammar schools might be brilliant pupils in a technical high school. The fact that a boy has a VQ of, say, 120 will, in most cases, justify his

admission to a grammar school ; but surely, if he has a PQ of 140 then he is still being approached on his weaker side, strong though that may be. It is true that as a high-grade technician he will use words, and to that extent a good deal of academic preparation will be necessary, but it is also true that he would learn more quickly and understand to better purpose if the methods of his education were of an " F " nature rather than of a " v " nature. The true educational provision for such a boy is not a grammar school but a technical high school.

Finally, under this heading, a word is necessary on the subject of retardation. Here the problem is not one of backwardness but of an adjustment of attainment to capacity. A child with a VQ of 120 and an attainment quotient of 100 is a greater educational tragedy than the child with a VQ of 90 and an attainment quotient of 80. The second child is certainly backward, but he is attaining to within ten points of his true capacity and to that extent he is not so great a misfit as the other child, whose attainment is twenty points below his capacity. Re-



tardation is a very widespread condition in our schools, and I believe that a far greater number of cases of retardation would be found amongst bright children than amongst dull children. The need, of course, is for regular mental surveys, in which the relationship between each child's attainment and capacity would be ascertained and the information made available to teaching staffs for individual cases where wide discrepancy was found. More detailed reference to the methods of carrying out a mental survey will be made in a later lecture on methods of selection. Meantime, I would emphasise my view that the problem of the retarded child probably deserves more attention at the present time than that of the backward child.

## METHODS OF SELECTION FOR POST-PRIMARY EDUCATION

THE factorial theory which has been discussed earlier has considerable significance for the problems of selection of pupils for higher education, since it should be possible to ascertain to what degree each of these factors enters into grammar school success and the amount of the factors which it is necessary for pupils to possess before they can be admitted to such schools with the expectation of being able to profit from the further education they will receive. There has in the past been a tendency to select pupils for grammar schools by means of an examination in English and Arithmetic. Such a policy reduces the award of a special place to an award for good work done in the junior school, but surely that is not the intention. The intention is more properly to give special places to those pupils who have the capacity to profit from secondary academic education. It is obvious that a child who has achieved well in the junior

school does not necessarily have the capacity to profit from further education. If two boys run a hundred yards in twelve seconds, in the absence of any other evidence we are not in a position to say which of them could run the same distance in ten seconds ; it may be that one of them has been trained almost to the limit of his capacity, while the other may be running with very little effort and have much left in reserve. I have mentioned earlier certain factors, and two in particular, which play a large part in the determination of success in academic study. These two factors are " g " and " v." Similarly, " g " and " F " play a large part in determining success in technical study. It would appear reasonable, therefore, to lay down as the purpose of methods of selection, the picking out, on the one hand of those pupils who have the capacity to profit from the type of education which it is proposed to offer in the grammar school, and on the other hand, of those pupils who have the capacity to profit from the type of education it is proposed to offer in the technical high school. Since at the present time selection



is principally undertaken for admission to grammar schools and since, further, the principles of selection remain the same for technical education with merely a variation in the type of tests used, it is proposed to discuss in some detail the problems of selection for admission to grammar schools only.

In selection it appears to me that there are three questions to be answered, and as the three questions are different in kind, the answers must be kept separate from one another. The first question is this: does the child *know enough* to *start* grammar school education? There is emphasis on the fact that he need only know enough to *begin* in the school; there is no question of trying to measure all he knows. The answer to this question provides a qualifying criterion and only those who already know enough to begin in the grammar school would be considered at this point, since whatever a child's capacity may be, if his attainment is not yet up to the appropriate standard, he is not ready to be considered for grammar school education. I suggest that there are two subjects in which

the child must know enough, English and Arithmetic. By English I mean essentially facility in reading, and by Arithmetic, facility in the arithmetic bonds. To test attainment in these two subjects we must use Minimum Essentials Tests, one in English and one in Arithmetic. The standard need not be a high one; it does not matter whether the pupil can do problems in weights and measures, with grammes and so on, but he should be completely familiar with his arithmetic bonds, so familiar that his responses are almost automatic. The answer to seven times eight should not require thinking about, it should bring a response as automatic as the knee reflex. I suggest that the Arithmetic test should be quite straightforward, involving the four rules and perhaps addition and subtraction of money. It should, however, include every arithmetic bond in its scope, since the child must be quite familiar with these processes before he can begin the study of mathematics, science and so on. It may be argued that he ought to prove that he can do problems in Arithmetic as well as the mechanical processes, but the

answer is that if a child is intelligent and knows the mechanical processes, he will be able to do problems. There are two separate factors which determine his ability to do problems ; on the one hand his standing in " g " and " v," on the other hand his knowledge of arithmetic bonds. To measure these together is to break the first principle of measurement ; it is just as big a mistake as using separate tests of Arithmetic and English and adding the results together. Making the mistake of combining capacity with attainment will produce results as confusing as those mentioned earlier in the imaginary selection of policemen. The English test should comprise questions on a passage be read, so that the child's capacity to read with facility and comprehension may be judged.

These two tests, then, form the qualifying criterion and give the answer to the first question. The children who do not pass them, but who prove later to have the capacity to profit, must be helped on in these two essential subjects before they can be admitted to the secondary school. This will



give rise to the need for over-age admission to these schools.

The second question is : have the children the capacity to profit from grammar school education ? Before this question can be answered we must know what factors are necessary for success in the grammar school, and in what proportions they are necessary. Research evidence<sup>1</sup> indicates that the two factors " g " and " v " in combination are the determining factors in academic study and, further, that they are necessary in approximately equal amounts. The ideal measurement would be two tests, one of " g " alone and one of " v " alone, but unfortunately, while " g " can be measured alone " v " cannot and the method suggested is therefore the use of an aptitude test which is equally loaded with " g " and with " v." What has been said earlier will make clear why such a test is called an " aptitude test " and not an " intelligence test." An even more appropriate name would perhaps be an Aptitude Test of Verbal,

<sup>1</sup> *Intelligence, Concrete and Abstract*, Cambridge University Press.

or Academic, Ability. This test, then, should be administered to the whole age group and will yield a VQ for each pupil.

The next step in selection will depend on the number of special places available. Too often this number is determined on a false basis, and it varies considerably from area to area. Ideally, of course, the number of special places provided in any area would be determined by the number of children who have the capacity to profit from grammar school education. It is generally agreed that all children with a VQ of 120 and over have the capacity to profit. If this standard were adopted, it would mean the admission to secondary schools of approximately 11 per cent. of the age group. Let us assume, for the purpose of this discussion, that this is the number of special places available. The results of the aptitude test for those children who satisfied the qualifying criterion give us, virtually, the order in which they have capacity to profit, but there is a third criterion of importance which must be satisfied. As already indicated, in an investigation designed to ascertain

the factors which determine success in the work of the secondary school it was found that in addition to "g" and "v" there was a factor "X," a factor in character, which we referred to as long-term persistence. The relative importance of these three factors in school work may be gathered from figures obtained in the investigation. It is not suggested that these figures are necessarily exact or absolute, but they may be taken to indicate the nature of the evidence on which the suggestions now being made are based. The figures are as follows :

In the study of English, the relative importance of the three factors taken on a percentage basis is—"g" 10 ; "v" 63 ; "X" 27. It is to be noted that this does not mean that "g" is of little importance in the study of English, but rather that, given enough "g," "v" is the most important factor in the situation. It will be obvious that even if he has high "v," a pupil will not reach a very high standard in English if he is lacking in "g." The point with which we are concerned at the moment, however, is the importance of "X."



In Mathematics, the results are even more interesting—"g" 31; "v" 19; "X" 48. The presence of the "n" factor accounts for the balance of the hundred.

Notice that in both of these subjects this "X" factor is of major importance and any method of selection which fails to take it into account can be but partially successful. Unfortunately, there is no objective method of measuring the factor and in practice the method to be adopted is to invite head teachers of junior schools to submit a rating on all of the pupils in the age group in this factor, long-term persistence, a rating controlled on a five-point scale to produce in each school 5 per cent graded A, 20 per cent. B, 50 per cent. C, 20 per cent. D and 5 per cent. E.<sup>1</sup> Having this information in advance, when the aptitude test results are available the following procedure should be adopted:

(a) All children with a VQ of 125 and over who have satisfied the qualifying criterion

<sup>1</sup> It is not suggested that in each school the pupils will, in fact, fall on such a curve. It is, however, necessary to ensure discriminative ratings in each school so that pupils within the school can be selected as better or worse in respect of this factor.

are allotted special places. The basis of the argument for this step is that these children are so well blessed by nature in capacity, that even if they lack determination in some degree they will be able to tackle the examinations at the end of the course. While the ability to pass these examinations may not be the true criterion of a successful pupil, so long as pupils are required to take the examinations the criterion must necessarily be that they should be able to do so. In this first group, therefore, the children have passed two of the tests, and have so much capacity to profit that the third test may be omitted.

(*b*) A border line in terms of the second criterion must now be drawn through the remaining pupils who have satisfied the first criterion, and the position of the line will, of course, depend on the number of special places available. When this number is 11 per cent. of the age group, the pupils in the border-line group will be those who, in terms of VQ, are between 116 and 124 inclusive. All these children have the capacity to profit from grammar school education if they have enough "X," enough

determination to back their capacity ; if they have not enough "X," then probably they will be unsuccessful ; they are the children who have just enough capacity to make a success if they can stick it, but who will meet with failure at the end of the course if they are not of the type to try and to keep on trying. There will probably be twice as many pupils in this group as there are special places still available, and the last step is to select from it those who have the highest rating in character.

In the light of what has been said above, it would be unfair, indeed, impossible, to make a comparison from school to school, and it is necessary, therefore, to adopt a procedure purely for practical purposes which avoids this difficulty. The procedure suggested is as follows :

Having, let us assume, twice as many candidates as there are places, one in every two of the pupils in the border-line group will be awarded a special place. We therefore allocate to each school half as many special places as it has pupils in the border-line group, so that a school having ten



candidates falling in the group will be allocated five special places. Reference will then be made to the ratings of these ten pupils in character, and the five highest in this respect will be selected for special places. In practice, a difficulty arises in the case of small schools, where only one or two pupils fall in the border-line group. Here the procedure must be to group all the small schools together. By reference to the relationship between the average attainment quotient of each school as judged by the minimum essentials tests and the aptitude test, some indication can be obtained as to whether a pupil from one school is likely to be a better selection than a pupil with the same results from another school. This question of the relationship between general attainment and capacity is one which will be answered by the use of mental surveys, which should precede or be part of the process of selection. I will deal with them later.

Meantime, it may be stated with some degree of definiteness as a result of experience, that a child with a VQ of 116 and an A rating in "X" will be a more satisfactory

pupil in a secondary school than a child with a VQ of 124 and a D or E rating in "X."

The method of selection outlined above has been used in the Borough of Brighton, where I had the privilege of acting as Chief Examiner for two years, and it is on the experience obtained there that the figures now quoted are based. The three criteria should be satisfied, first that the child knows enough to begin, second that he has the capacity to profit and third that he has the necessary determination to support his capacity. Apart from its reliability as a method of selection which, it is believed, is greater than in any alternative method yet put into operation, this method has other virtues. It has the virtue of freeing the junior school from the need to coach and cram for the scholarship examination. One of the features of junior school work which, in the past, prevented the possibility of education was the spectre of the scholarship examination, causing intense cramming and the elimination of educational purpose. Since the examination in attainment proposed in our method of selection is in minimum

essentials, it is quite unnecessary for special preparation to be made, because the necessary standard will be attained with great ease by all children who have the slightest chance of profiting from secondary education. Again, the aptitude test used is so largely independent of the work of the junior school that there is no need to prepare for it ; indeed, in any junior school doing so there must be a complete lack of appreciation of the purpose of the test.

There is one point which should be noted here. I have said throughout that an aptitude test is used, but in actual practice two or perhaps three such tests are used, on different days, to allow for day-to-day variation and to overcome the unreliability of a single test used on a single occasion. The best method of all would be to gather information about each pupil's capacity over a period of probably a year or more prior to the completion of the junior school course, but where that is not done, an adequate method will be to give two or three tests on different days and to take as the true capacity of each child either his mean VQ or, in my view even better, the



highest result he obtains. In general, there should be, and usually is, a very large measure of agreement between results of different aptitude tests given on different days.

I have presumed, in setting out the procedure for selection for grammar schools, that the system operative is the one hundred per cent. special-place system. I know that this is not at the moment the general system in force, but it is anticipated that it will increasingly become the practice of local authorities, since it must be obvious that the only appropriate basis of selection is capacity to profit and not capacity to pay.

Closely related to the practice of selecting pupils for further education is the practice of carrying out mental surveys in schools; indeed, the mental survey properly carried out provides all the information necessary for selection and eliminates the need for a special examination. I propose, therefore, to give in some detail the procedure for carrying out a mental survey.

Carefully standardised attainment tests and aptitude tests are administered to all the children in a particular age group in an

area. The results thus obtained give the following information for every child : Arithmetic Quotient ; English Quotient ; Verbal Quotient.<sup>1</sup> The correct educational result is for these three values to be the same.<sup>2</sup> This information taken in the area as a whole is of the greatest possible value in terms, not only of individual pupils but of individual schools, because for each school it is possible to obtain a mean VQ, a mean Arithmetic Quotient and a mean English Quotient. Just as these three figures should be very close together for each individual pupil, so they should be in the case of each school. If, for example, the mean VQ for any particular school is 100, indicating that the pupils are, on the whole, of average capacity, then the Arithmetic Quotient should also be 100 and so should the English Quotient. Judgment must not be passed on the work of any school unless the

<sup>1</sup> Care must be taken to ensure that the tests allow for the range of ability in the group. For that reason Minimum Essential Tests are not ideal for survey purposes since they may involve a "ceiling" effect, i.e. all pupils above a certain point may score the same. A quotient in this case is not comparable with an IQ where no ceiling effect is involved.

<sup>2</sup> See footnote on page 50.

capacity of its pupils is taken into account. The expectation that the standard of work in all schools will be the same makes the assumption that all schools have children of the same average capacity ; since it is a well-known fact that schools in different areas, and even in different parts of the same area, have children of widely differing capacities, it is inevitable that differences in the standards of work of different schools will occur, and, indeed, should occur if the education of the children in each of the schools is to be in accordance with their capacity.

It may be found that for a particular school the mean Arithmetic Quotient is higher than would be expected, i.e. higher than the mean VQ, whereas the English Quotient is lower than the mean VQ. This is a matter for investigation by the head of the school. It may be that the balance of the time-table is wrong, that too much attention is being devoted to Arithmetic and too little to English. It may be a problem in staffing, that the teacher in charge of the age group is better at teaching Arithmetic than English. Whatever the reason may be, some adjustment



must be made, because while there is no suggestion that the value of the work of the junior school can be judged solely in terms of minimum essentials in English and Arithmetic, it is and must always be true that an essential part of the work of the junior school is to ensure that the children are taught these two subjects in accordance with their capacity. Results taken for an area as a whole will indicate this relationship between the average attainment of the pupils in different schools and their average capacity, and will therefore enable a reasonable judgment to be made on the work of the schools as a whole.

In addition to these three values, the following figures may also be obtained from the survey results :

*Mean Achievement Ratio in Arithmetic.*—This is obtained by dividing the Mean Arithmetic Quotient by the Mean VQ, and it should approximate to 100 if the attainment in Arithmetic is in close relationship to the capacity of the children.

*Mean Achievement Ratio in English.*—This is obtained by dividing the Mean English Quotient by the Mean VQ.

*Mean Achievement Ratio for both Subjects.*—This is obtained by taking the mean of the Arithmetic Quotient and the English Quotient, which may properly be called the Attainment Quotient, and dividing by the mean VQ.

*Relative Ratio.*—This is the relationship between the English Ratio and the Arithmetic Ratio. If a proper balance between these two subjects is being maintained, this value should also approximate to 100.

Actual figures obtained in a mental survey in one area were as follows :

Mean VQ	.	.	.	.	.	100.6
Mean Arithmetic Quotient	.	.	.	.	.	101.9
Mean English Quotient	.	.	.	.	.	103.8
Mean Achievement Ratio (Arithmetic)	.	.	.	.	.	101.1
„ „ „ (English)	.	.	.	.	.	103.1
„ „ „ (both)	.	.	.	.	.	102.1
Relative Ratio	.	.	.	.	.	101.7

These figures are entirely satisfactory and indicate that in the area as a whole the children are of average capacity and are doing average work in the essentials of Arithmetic and English. The range amongst the different children may be indicated by the following limiting values obtained in the same survey :

The mean VQs of the different schools varied from 92 to 114.

The mean Arithmetic Quotients varied from 88 to 118, indicating approximately the same range in attainment in Arithmetic as in the capacity of the pupils.

Mean English Quotients varied from 88 to 114.

Mean Achievement Ratios in Arithmetic varied from 88 to 110, indicating that at least in certain of the schools there was not a proper relationship between the standard of work in Arithmetic and the capacity of the pupils. It has been our usual practice to presume that a value between 95 and 105 may be taken to indicate a satisfactory state of affairs either in Arithmetic or English or in Relative Ratios. Values below 95 indicate that the standard of work is rather lower than would be expected and that there is need to devote more time to the subject; values above 105 indicate over-attention, and justify a reduction of time devoted to the subject.

Mean Achievement Ratios in English varied from 92 to 112. Again certain schools fell outside the reasonable limits.



Mean Achievement Ratios for both subjects showed a narrowing down to limits of 95 and 105, indicating that in the two subjects taken together the output of the schools is reasonably in accordance with the capacity of the children but that, having regard to the previous figures, in certain schools one subject is being over-stressed at the expense of the other, and the balance of time-table or other relevant factors require attention.

Head teachers usually welcome having this information made available to them, because it enables them to assess the work in these essential subjects in relation to the capacity of their pupils, not merely in average terms based on norms for the country as a whole, but in terms of the schools in their area. In making the results of such a survey available to an education committee, it is, of course, necessary that they should be presented in the form of distributions without reference to particular schools, to avoid invidious comparisons being made. Each head teacher may himself work out for each of his pupils similar figures to those given above,

indicating whether the individual child is achieving in Arithmetic and in English in accordance with his capacity ; and just as the head of a school will investigate any weakness indicated by the figures for his school as a whole, so he will investigate any weakness indicated by the figures for an individual child.

The information as a whole, together with school ratings on character, forms an adequate basis for selection for grammar schools, and where mental surveys are regularly carried out the need for a special examination is avoided. The information should, of course, be passed to the senior schools in the area, to enable classification to be made immediately on entrance, subject only to the additional testing in "g" and "F" being carried out after admission to those schools, as discussed earlier.

Finally, may I say a word on the subject of selection for technical education. The procedure is essentially similar to that obtaining for selection for grammar schools, in that the same three questions have to be answered. The first and third of these remain the same,

with an emphasis on Arithmetic as part of the qualifying criterion. The second question, as to capacity to profit, must be answered by the use of performance tests to measure "g" and "F" in combination. Unfortunately, so far no group test is available and therefore individual testing, similar to that suggested for classification in the senior school, must be carried out. It is to be noted, however, that where selection for technical education is made at the age of thirteen, if the senior schools were classified as suggested here no difficulty whatever would arise, since the information necessary for selection would already be available; indeed, it would substantially be known at the age of eleven plus which children should be passed on to technical high schools. The practice of admission to Technical Education at thirteen years results too often in the best future technicians finding their way to Grammar schools at eleven plus.

It has been suggested that in such cases transfer should be made at the age of thirteen, but experience has shown that, obvious as this solution is, it just does not



take place. In these circumstances the case for selection for both technical and grammar schools at the same age becomes stronger. The hierarchic theory suggests that so far as level of "g" is concerned, there is no justification for any differentiation in status between technical education and academic education. It seems to me that the solution will probably lie in keeping all children in senior modern schools until the age of thirteen, and then making the selection for further education. The arguments against postponing the admission of children to grammar schools until thirteen are strong, but I doubt whether they outweigh the arguments in favour of selection for both types of further education at the same age. This is a matter which is most adequately discussed in the Spens Report, and the only point to which I wish to draw attention is that the suggested solution in that Report, of selecting for both forms of education at eleven, is probably on balance less desirable than selection at thirteen. The desirability of a transfer at eleven into senior modern schools is not disputed ; what is doubted is the value of any

form of specialisation before the age of thirteen. It is true that the grammar school is not deemed to give specialised education, and recent suggestions for the broadening of the curriculum in such schools indicate that increasingly it may be true that they provide general education. Even so, we must realise that for academicians a grammar school is just as much a vocational affair as a technical school is for technicians. An appropriate arrangement would be to pass all children into senior modern schools at the age of eleven, and to carry out selection for both forms of higher education at the age of thirteen plus. In my opinion, the senior modern school is providing better general education than the grammar school for children of eleven plus. It would be most worthwhile to see an experiment conducted along these lines.

The whole question of methods of selection for post-primary education is one of the gravest possible importance, and the report which it is understood will shortly be issued by a special Committee of the Board of Education will be awaited with considerable interest.

## THE EDUCATIONAL FRONTIER

So far we have been concerned to examine the significance of the hierarchic theory for organisation, method and curriculum in the schools. In this lecture I should like to discuss the broader implications of an educational philosophy which incorporates the hierarchic theory and perhaps, to some extent, arises out of it.

### *The Aim of Education*

I have been profoundly disturbed sometimes to note a tendency in many teachers to go on teaching a particular subject, or giving a particular lesson, in the same way without ever stopping to ask themselves whether their method was worth while, whether the lesson was performing its function. On asking such a teacher why he or she is teaching the subject or giving the lesson, the answer would probably be "Because it is in the syllabus." To ask why it is in the syllabus would call forth the retort that the teacher concerned had not prepared the syllabus. Such an



attitude indicates very clearly the teacher's need for a goal, for surely the first consideration in any general discussion on education must be a statement of its aim. I remember a story I heard once about a negro, sweeping dust into the gutter on a lonely country road, who was asked by a passing motorist the way to the nearest town. He replied that he didn't know the way, and the motorist exclaimed that if the negro didn't know the way he must himself be lost ; to which the negro replied, " I can't be lost, boss. I ain't going nowhere." Does the incident have a moral for education ? Is it that we, too, cannot be lost for the same reason ? If so, is there a danger that we, like the negro, may continue sweeping dust into the gutter, never lost but never getting anywhere ?

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The aim of education is two-fold : ultimate and proximate. The ultimate aim we hope will be attained on the completion of the school course ; the proximate aim is the goal we have before us in a particular lesson or on a particular day. What modification of attitude to be effected, what facility or skill to be developed, what information to be

learned in any particular period—these will constitute our proximate aim. The proximate aim is necessary for progressive attainment or development, but in itself it is not enough. By what criterion shall we judge whether the proximate aim in this lesson or in that is justified? The proximate aim must always conform to the ultimate aim. Each lesson or project or piece of work must be contributing to the realisation of some part of the ultimate aim. /

Of primary importance, then, is a clarification in terms of the ultimate aim. Much has been written on this subject; the ultimate aim has been defined in an almost endless variety of ways. Perhaps the realisation that the school to-day faces a new task justifies a rewriting of the definition of the ultimate aim. The school is faced with the task, surely, of finding its place in the scheme for social reconstruction which is fated to lift society from its present almost chaotic state; the school must face the reality of our present failures, a reality which in the present social-economic situation makes urgent demands. The individual citizen must be brought to a realisa-

tion of the values that are implicit in the struggle for security in a world where corporate action has now become a basic characteristic ; he must be made to realise the fact of international interdependence in the world situation ; he must become concerned for the educative effect of all social institutions where men plan together to establish a social order in which life for all may flow from a stable source, where, to use the terms we have used earlier, the full realisation of the multiple factor pattern which we have been discussing may be achieved for all members of society. He must, too, appreciate the need for a method of action which quite naturally revises old values as changing conditions necessitate new attitudes. It is true that the school cannot accept sole responsibility for the remaking of society ; it is at best only a single educational influence in the life of its students, and there may be a danger that as the school is now organised it is so much out of relationship with society that it may become the least effective of all the forces that play upon the pupil as he moves towards the final attitudes and



dispositions which give character to society. This danger makes us realise that our ultimate aim must have the virtue of reality ; we must reconsider the contribution that the school may make to social reconstruction ; we must avoid running away from society and increase the closeness of contact between forces outside the school and those inside the school.

It is for these reasons that in our ultimate aim there is need, perhaps, for a change of emphasis. In the past we have directed too much attention to the things in which we have been successful, to the affairs in which human intelligence has been exercised with satisfactory results, neglecting to direct the attention of each pupil to the many problems in which human intelligence has failed and, even more important, to the problems towards the solution of which intelligence has not been directed at all. The children now at school must face the unsolved problems of society ; to avoid a reference to them in school is to fail to make the pupils conscious of the contribution they will require to make towards their solution. Is it not true that we have in our aim been perhaps too much

concerned to fit the child into existing society, and too little concerned, perhaps too much afraid, to make him realise that there is need for society to be modified to fit his needs ? I have said elsewhere when defending modern youth against the charges so often brought against him that society has charged the schools with the responsibility of making youth fit for society. Perhaps it is time that we started making society fit for youth to live in. The self-satisfaction which comes from a study confined to the matters in which human intelligence has been exercised successfully is not an attitude likely to result in a major contribution to the unsolved problems. The ways in which human intelligence has solved the problems of production, for example, receive a good deal of admiring attention ; do we spend as much time directing the attention of our pupils to the problems of consumption and distribution which have been created by the solution of the problem of production ? We spend much time talking about democracy and democratic institutions and their virtues. Do we devote as much time to making our pupils conscious of its weaknesses and of the

ever-growing need for democracy to clarify its procedures and its methods if it is to survive? How much opportunity do we give our pupils for practising democracy, rather than talking about it? Surely it is true that an appreciation of the deeper significance of the democratic way of life comes, not from reading about it and talking about it, but by practising it.

These considerations lead us to a statement of the ultimate aim of education, a statement made and discussed in an excellent book published in America by the joint effort of certain of the leading thinkers in the field of education in that country. The title of the book, very appropriately, is *The Educational Frontier*. The statement may be divided into five parts. The question we are trying to answer is : what is it reasonable to expect the school to do for its pupils? We would answer :

(a) It is reasonable to expect the school progressively to make the pupil aware of the life of which he is a part ; to make him realise his place in the school, the school's place in



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(a) It is reasonable to expect the school progressively to make the pupil aware of the life of which he is a part ; to make him realise his place in the school, the school's place in

his community ; the place of the community in the nation, the place of the nation in the world.

(b) It is reasonable to expect the school to provide situations which will lead the pupil progressively to direct his action by an integrated and unified attitude in which he increasingly believes.

How important that section is. I wonder to what extent the imparting of knowledge in the form of *subjects* prevents the realisation of this goal. I believe that the effect of subject teaching in school is to prevent the development of an integrated attitude, causing the pupil instead to develop a capacity for water-tight compartment thinking, failing to realise the relatedness of knowledge. Too many of us find it possible to continue this attitude in later life. We attend Church on Sunday and accept a philosophy of life for that day ; on Monday, in our business pursuits, we work to quite a different philosophy, and on Saturday our various forms of recreation call for still another philosophy. We do not seem to find it difficult to hold



these antagonistic philosophies separate in our water-tight compartment minds ; indeed, we may have reached the stage when we do not even perceive that they are antagonistic and incongruous. Here again a story about a negro is not inapt. A burly fellow was brought before the court charged with a variety of offences, including wife-beating. He brought forward as his only defence that, whatever else he might have done, he had never lost his religion ! In considering this part of the ultimate aim, we must also consider the question of specialisation in school teaching, because of the danger that specialised teaching may prevent the progressive development of an integrated and unified attitude. However, I will postpone consideration of that topic for the moment.

(c) It is reasonable to expect the school to encourage the development of independent interests, intellectual, æsthetic or practical, on the part of its pupils.

Here we are on safe ground and will find general agreement. It is to be noted, how-

ever, that some emphasis is necessary on the word *independent*. We can only repeat what we have said earlier, that too much teaching may prevent independent learning on the part of the pupils.

(d) It is reasonable to expect the school to set up an environment in which all of its pupils, through active participation in its organisation and control, may move progressively to a more complete appreciation of the deeper significance of the democratic way of life.

This part of the aim is not to be achieved by setting up a course in Civics. Too often the setting up of courses has been allowed to take the place of active participation. Experience teaches, but I doubt whether a course in Civics gives pupils the right kind of experience. It is not always an experience for a pupil to be taught. The only way to experience democracy is to practise it. Recent developments in self-government in schools have been a move in the right direction, but there is need for a much greater degree of

reality, for a much greater correlation between life inside school and life outside school, so that when the pupils go out into the world they may not find themselves in a completely alien atmosphere.

(e) It is reasonable to expect the school to realise quite frankly that if it would contribute to the reconstruction of the social structure, it must be prepared to direct internal experiment towards a reconstruction of its own methods and curricula.

This need for experiment in educational procedures is being increasingly realised, and it is perhaps true that the basic conservatism from which our education appears to have suffered in the past is rapidly diminishing. There is still, however, a considerable body of educational thought which is prepared to defend former procedure merely on the grounds that it has been successful in the past. While it is obvious that we must always guard against the desire for change merely for the sake of change, that we must safeguard methods which have been success-



ful from being discarded on inadequate grounds, yet we must be prepared to effect changes where these become essential. We must, too, be satisfied that the experiments which are directed towards the reconstruction of educational thought and procedure are carefully devised and provide adequate evidence on which reconstruction may be based. For that reason I believe that the time has come for the establishment in this country of a body to direct educational research on a national basis. So often research with real possibilities fails to be developed on an adequate scale because of the lack of a central body to sponsor its development, and on the other hand inadequate evidence is often accepted for the need for change in a particular direction because there is no authority concerned to sift such evidence and evaluate its worth. Whether this is a task for the Board of Education or for the National Union of Teachers, or both, they must decide, but having regard to the vast expenditure of public money now involved in the educational service, it would appear reasonable that some of this could be allocated

to a research programme. If we hope to modify the social structure in a progressive manner, we must be prepared to modify our own procedures progressively.

Here, then, is an ultimate aim in the light of which we may frame our syllabuses of work, our curricula and, to some extent, our methods. There are certain broad problems of a controversial nature to which it appears to me this definition of the ultimate aim provides possible answers ; not least of these is the problem of specialisation, and this we must now discuss.

### *Specialisation*

In the senior modern school the query is often raised as to what degree of specialisation is necessary or desirable. Before answering this question, we must ask another one : should the school time-table be framed in terms of subjects at all ? When we refer to a specialist teacher, we mean a teacher of a special subject. I have suggested earlier that the imparting of knowledge in the form of subjects may not be the best educational method. If we are to have integration in the

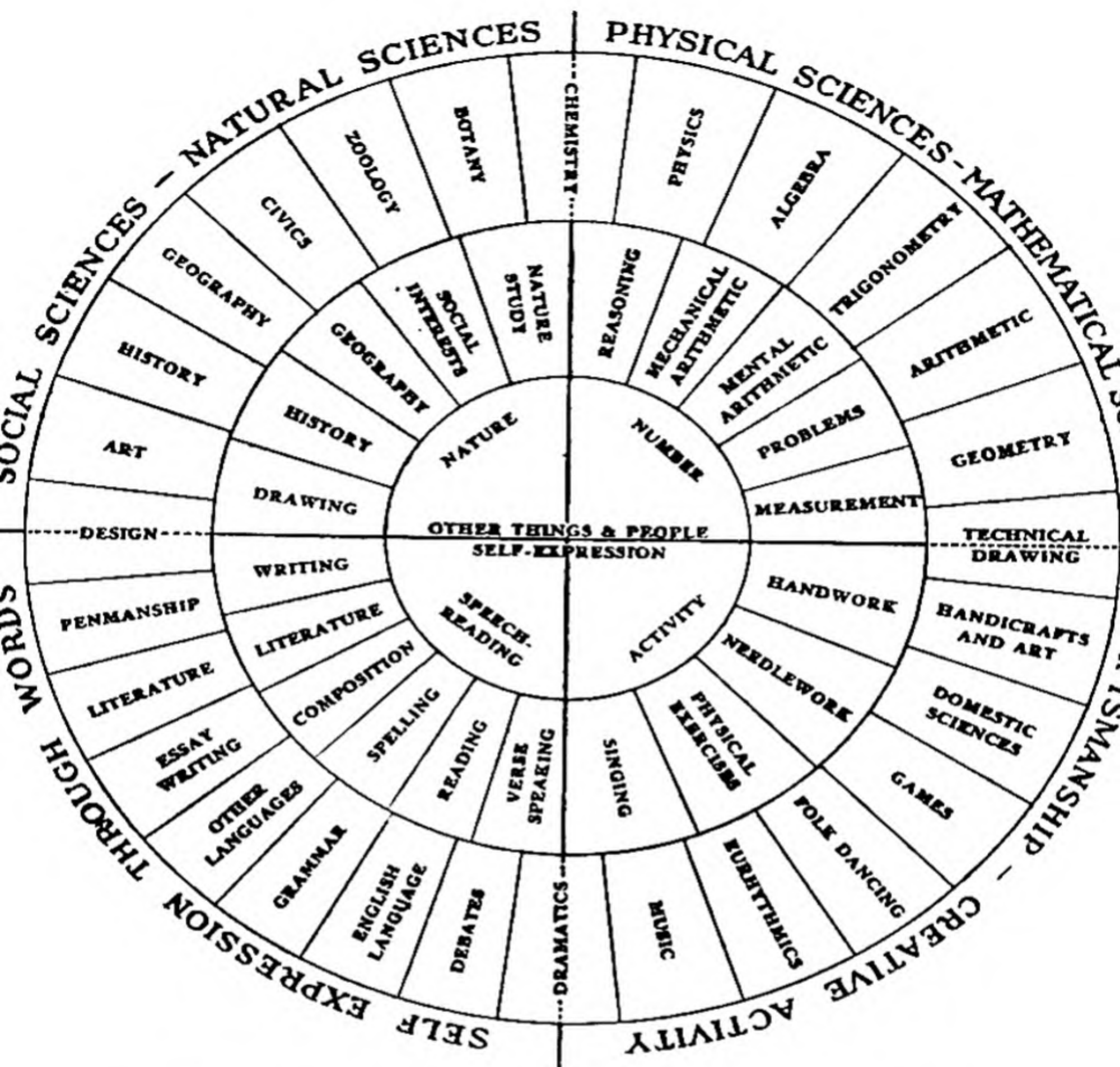
work of the schools, then the pupil must surely always be aware of the relationship amongst the subjects he studies ; indeed, he should realise that ultimately these subjects are not separate at all but are merely different aspects of a tremendous body of knowledge ; that the divisions into subjects are artificial divisions we ourselves are forced to make because of the ever-increasing extent of our knowledge. Is this possible where different teachers take separate subjects with no attempt at integration, each of them striving for an ever-greater place in the curriculum for his field of study ; each of them, it may be, himself lacking in an appreciation of the inter-relationship between his subject and others ; each of them, in fact, concerned solely with instruction in a particular subject and almost wholly failing to realise the need for education as a whole, which is surely not a matter of subjects at all ? The teacher of physical training, if he would realise the full scope of his work, must of necessity know something of music, since the rhythm of physical movement is so closely related to the rhythm of music. For example, in folk dancing, which



may be described as physical movement accompanied by music, I suggest that it will be most worthwhile educationally for the children to make their own music, which will involve making music pipes. This will take the teacher into the sphere of craft ; it will involve the principles of sound and thus lead to science. So the process of integration goes on, and gives rise to the suggestion that subject specialisation is not justified at all. The answer to such a suggestion may, of course, be that the specialist teacher, by his deeper knowledge of his special subject, inspires an enthusiasm which a non-specialist teacher cannot arouse. To some extent that is true, but a substantial knowledge of a subject does not necessarily make a good teacher and it is certainly no implicit guarantee of a correct educational approach. To those who would educate, a knowledge of subjects is of less importance than a knowledge of children. Education in the infant school may broadly be divided into four sections in the time-table, and it seems to me that if we could retain these four divisions right up through the school structure, then specialisation in one of these

*divisions* might provide the solution to the problem. The four initial divisions are words, number, nature and creative activities. When we reach the senior school stage these have broadened substantially but have suffered no basic alteration, for we must realise that work in the junior school and in the senior school should be essentially a development of that which began in the infant school. The four divisions in the infant school and their development through junior school to senior school stage may be given in the form of a diagram as shown opposite.

It is, of course, unlikely that we shall find teachers able to take the whole of the educational programme for any one class at the senior school stage, but at least we may find teachers capable of covering one of these four sections. In the case of Mathematics and Physical Science there is little difficulty, and in the case of the other three quarters it should be possible to train teachers, or shall we say, to educate teachers, so that they could take the whole of one section in the senior school. Specialisation in this form would probably be a workable compromise and



The inner circle represents Infant School beginnings, and the development of the four sections through Junior and Senior Modern and Secondary School is shown in the outer circles.



would ensure the double virtue of realising the value of integrated knowledge on the one hand and of carrying into the work the enthusiasm and stimulation of the specialist on the other. If this be so, then surely the time-table of the senior school would be framed with the same flexibility as that of the infant school ; we would have a section of time devoted to verbal work, number work, creative work and the study of nature, not on the basis of periods of twenty or forty minutes but periods sufficiently long to enable a job of work to be done. It is not suggested that this means a complete acceptance of the project method, because valuable as a project, such as the study of the nourishment of the community, may be, its value will be the greater if it is accompanied by definite learning of procedures or knowledge required for the project. The expectation that facility in Arithmetic or English can be developed quite incidentally in the carrying out of projects is probably not wholly justified and for that reason it will be necessary to devote some time to specific study of these sections of learning, or, as they may more properly be

called, of these tools of learning, in order that the project may adequately perform its task of providing opportunities for practice in their use. The motivation value, the zest that comes from doing a job of work with a broad interest and appeal, will be lost so long as methods of study are confined to periods of twenty or forty minutes in certain subjects.

I plead, therefore, for a flexibility of timetable, for greater reality in method and for a restriction of specialisation, if our ultimate aim is to be achieved. The development of reality in method calls, I think, for special discussion.

### *The Need for Reality*

We have discussed earlier how essential it is that the school should not divorce itself from society if it is to effect any change in the social structure. How can the school establish greater contact with society? Obviously the tasks to be undertaken in school must be real, real in the sense of having a meaningful relationship to those to be undertaken outside the school. Much has already been achieved in this direction, but much still remains.

The introduction of the school garden, the increase in school visits into the community itself, the growing tendency to bring people into the schools to talk about life outside the school, all have tremendous value and should be extended. It is, of course, impossible to lay down the particular ways in which reality can be brought to schools in general; that is a problem which the individual teacher must face in each school, according to the particular community in which he finds himself. Reality in a small country school will take a very different form from reality in a large urban school, but the principle remains the same though the practice must vary according to the environment of the school itself. It is perhaps true that it is in the urban community that the danger of unreality is greatest.

Closely related to the problem of reality is the question of pupil responsibility. If pupils are to be sent out into the community in order to obtain their educational values, then they must increasingly be allowed to accept responsibility for themselves and their fellows. The teacher must



move progressively into the rôle of general guide ; his high desk, with its authoritarian implication, has been left behind and so, to a large extent, has the rigid furniture of the classroom. He finds himself increasingly faced with the task, not of telling his pupils what he thinks they should know, but of accompanying them in an investigation of the unknown—unknown both to them and to himself. Experiment has indicated that we may, in the past, have underrated children's ability to take responsibility ; we have certainly, as teachers, been too unwilling to admit our own ignorance before our pupils.

The task before our teachers to-day is not an easy one. It is less difficult to prepare instruction than it is to plan learning. The schools can make a very real contribution to the community and can by their combined effort play a substantial part in the solution of the many problems with which society is faced. It is not enough to study the life of the community. The school must make a positive contribution to its development.

*General Summary and Conclusion*

In all that has been said, I have been concerned to develop one principle, the principle of education as opposed to instruction. In doing this, I have tried to effect a realisation of the need to take into account individual differences in pupils in degree of ability and in type of ability. I have suggested the need for a constant stress on the development of the inborn talents of the child ; the need for a goal determined, not by a static society, but by a realisation of how the developed talents may contribute to the social structure. I have deplored the implications which accompany instruction, the rigidity of method and curriculum, in furniture and buildings, the drive towards normality with its disastrous effects on the dull and the bright alike. In the past the schools, and society too, have been designed to a considerable extent for the average person : the height of desks, the size of rooms, the rate of progress, the subjects of study, the relative stress on subjects, the whole of the procedures of the school have been

designed to suit the average child. I have pleaded for a departure from this rigidity; for the use of methods and curricula which allow for the variations amongst children; for bringing into the schools the values and reality which society at present accepts, and for taking into the community critical judgment and constructive suggestion which may help to make society better fitted for its individual members. I have pointed out the danger of confining our attention to success, and the need to point out our failures, that our children may be conscious of their task of solving in their time the problems we have failed to solve in our own generation. Above all, I have suggested that the time is past when we can accept as our goal the fitting of children into the educational machine, that the need now is to fit the machine to the individual child. It is well to remember that the schools were created for the children, and our responsibility is to see that they fulfil their true educational function, not for one but for all.

Here, then, is the educational frontier which we now face, full of opportunities and



full of difficulties. It has been said that the difference between an optimist and a pessimist is that the optimist makes an opportunity out of a difficulty and the pessimist makes a difficulty out of an opportunity. It is in a spirit of optimism that we must go forward.

